In the Claims

Please amend the claims in accordance with the following list:

1. (Original) A shock and vibration isolation system for mounting equipment to a base wall, the system comprising:

a load plate configured for attachment of the equipment thereto;

a base plate configured for attachment to the base wall; the base plate being substantially parallel to the load plate;

a spring arrangement disposed intermediate the load plate and the base plate, the spring arrangement engaging the load plate and the base plate to bias the load plate and the base plate in a separated relationship;

a semi-active damper disposed intermediate the load plate and the base plate, the a semi-active damper being adapted for providing a selectively variable reaction force to the load plate and the base plate responsive to a relative displacement of the load plate with respect to the base plate;

a damper controller operatively connected to the semi-active damper for controlling the reaction force applied to the load plate and the base plate, the damper controller including a rechargeable power supply; and

a recharging arrangement in electrical communication with the rechargeable power supply, the recharging arrangement being mounted to one of the base plate and the load plate and being adapted for converting vibratory motion to electrical energy for storage in the rechargeable power supply.

2. (Original) An isolation system according to claim 1 wherein the semi-active damper comprises one of a magnetorheological fluid damper and an electrorheological fluid damper.

3. (Original) An isolation system according to claim 1 wherein the damper controller includes an optimum damper force determination module configured for determining from real time data a relative displacement of the load plate and a relative velocity of the

load plate with respect to the base plate and for determining an optimum reaction force based on the relative displacement and relative velocity.

4. (Original) An isolation system according to claim 3 wherein the controller further includes

a current driver operatively connected to the semi-active damper and the power supply for selectively supplying current to energize the semi-active damper;

a damper force control module in communication with the optimum force determination module and the current driver, the damper force control module being adapted for controlling the supply of current to the semi-active damper according to a predetermined control algorithm.

5. (Original) An isolation system according to claim 4 wherein the control algorithm is selected from the group consisting of clipped optimal control, velocity feedback control and acceleration bang-bang control.

6. (Original) An isolation system according to claim 1 wherein the recharging arrangement includes an electrical coil, at least one spring and a magnet connected to the at least one spring, the magnet being disposed within the electrical coil so that oscillation of the magnet produces a current in the electrical coil.

7. (Original) An isolation system according to claim 1 wherein the recharging arrangement includes a piezoelectric generator.

8. (Original) An isolation system according to claim 7 wherein the piezoelectric generator comprises at least one piezoelectric stack generator formed as a laminate of a plurality of prismatic piezoelectric crystals, the piezoelectric stack generator having an upper PSG surface and a lower PSG surface.

9. (Original) An isolation system according to claim 8 wherein the piezoelectric stack generator is disposed intermediate the load plate and the equipment so that the upper PSG

surface is engaged by the equipment and the lower PSG surface is engaged by the load plate.

10. (Original) An isolation system according to claim 8 wherein the piezoelectric stack generator is disposed intermediate the base wall and the base plate so that the upper PSG surface is engaged by the base plate and the lower PSG surface is engaged by the base wall.

11. (Original) A shock and vibration isolation system for mounting equipment to a base wall, the system comprising:

a load plate configured for attachment of the equipment thereto;

a base plate configured for attachment to the base wall; the base plate being substantially parallel to the load plate;

a spring arrangement disposed intermediate the load plate and the base plate, the spring arrangement engaging the load plate and the base plate to bias the load plate and the base plate in a separated relationship;

semi-active damping means for providing a selectively variable reaction force to the load plate and the base plate responsive to a relative displacement of the load plate with respect to the base plate;

damping control means for controlling the reaction force applied to the load plate and the base plate by the semi-active damping means;

a rechargeable power supply in communication with the damping control means and the semi-active damping means; and

recharging means for charging the rechargeable power supply, the recharging means being mounted to one of the base plate and the load plate and including means for converting vibratory motion to electrical energy for storage in the rechargeable power supply.

12. (Original) An isolation system according to claim 11 wherein the semi-active damping means comprises one of a magnetorheological fluid damper and an electrorheological fluid damper.

13. (Original) An isolation system according to claim 11 wherein the damping control means includes an means for determining an optimum damping force from real time data including relative displacement of the load plate and relative velocity of the load plate with respect to the base plate.

14. (Original) An isolation system according to claim 13 wherein the damping control means further includes

means for selectively supplying current from the power supply to energize the semi-active damping means;

means for controlling the supply of current to the semi-active damping means according to a predetermined control algorithm.

15. (Original) An isolation system according to claim 14 wherein the control algorithm is selected from the group consisting of clipped optimal control, velocity feedback control and acceleration bang-bang control.

16. (Original) An isolation system according to claim 11 wherein the means for converting vibratory motion includes an electrical coil, at least one spring and a magnet connected to the at least one spring, the magnet being disposed within the electrical coil so that oscillation of the magnet produces a current in the electrical coil.

17. (Original) An isolation system according to claim 11 wherein the means for converting vibratory motion includes a piezoelectric generator.

18. (Original) An isolation system according to claim 17 wherein the piezoelectric generator comprises at least one piezoelectric stack generator formed as a laminate of a plurality of prismatic piezoelectric crystals, the piezoelectric stack generator having an upper PSG surface and a lower PSG surface.

19. (Original) An isolation system according to claim 18 wherein the piezoelectric stack generator is disposed intermediate the load plate and the equipment so that the upper PSG surface is engaged by the equipment and the lower PSG surface is engaged by the load plate.

20. (Original) An isolation system according to claim 18 wherein the piezoelectric stack generator is disposed intermediate the base wall and the base plate so that the upper PSG surface is engaged by the base plate and the lower PSG surface is engaged by the base wall.

21. (Original) A shock and vibration isolation system for mounting equipment to a base wall, the system comprising:

a load plate configured for attachment of the equipment thereto;

a base plate configured for attachment to the base wall; the base plate being substantially parallel to the load plate;

a spring arrangement disposed intermediate the load plate and the base plate, the spring arrangement including at least one pneumatic spring engaging the load plate and the base plate to bias the load plate and the base plate in a separated relationship;

a magnetorheological damper engaging the load plate and the base plate and being adapted for providing a selectively variable reaction force to the load plate and the base plate responsive to a relative displacement of the load plate with respect to the base plate;

a damper controller operatively connected to magnetorheological damper for controlling the reaction force applied to the load plate and the base plate, the damper controller including a rechargeable power supply; and

a recharging arrangement in electrical communication with the rechargeable power supply, the recharging arrangement comprising at least one a piezoelectric generator adapted for converting vibratory motion to electrical energy for storage in the rechargeable power supply.

22. (Original) An isolation system according to claim 21 wherein the damper controller includes an optimum damper force determination module configured for determining from real time data a relative displacement of the load plate and a relative velocity of the load plate with respect to the base plate and for determining an optimum reaction force based on the relative displacement and relative velocity.

23. (Original) An isolation system according to claim 22 wherein the controller further includes

a current driver operatively connected to the magnetorheological damper and the power supply for selectively supplying current to energize the magnetorheological damper;

a damper force control module in communication with the optimum force determination module and the current driver, the damper force control module being adapted for controlling the supply of current to the magnetorheological damper according to a predetermined control algorithm.

24. (Original) An isolation system according to claim 23 wherein the control algorithm is selected from the group consisting of clipped optimal control, velocity feedback control and acceleration bang-bang control.

25. (Original) An isolation system according to claim 21 wherein the recharging arrangement includes an electrical coil, at least one spring and a magnet connected to the at least one spring, the magnet being disposed within the electrical coil so that oscillation of the magnet produces a current in the electrical coil.

26. (Original) An isolation system according to claim 21 wherein the piezoelectric generator comprises at least one piezoelectric stack generator formed as a laminate of a plurality of prismatic piezoelectric crystals, the piezoelectric stack generator having an upper PSG surface and a lower PSG surface.

27. (Original) An isolation system according to claim 26 wherein the piezoelectric stack generator is disposed intermediate the load plate and the equipment so that the upper PSG surface is engaged by the equipment and the lower PSG surface is engaged by the load plate.

28. (Original) An isolation system according to claim 26 wherein the piezoelectric stack generator is disposed intermediate the base wall and the base plate so that the upper PSG surface is engaged by the base plate and the lower PSG surface is engaged by the base wall.

29. (Original) A self-powered semi-active damping system comprising:

a semi-active damper disposable intermediate a load and a base wall, the a semi-active damper being adapted for providing a selectively variable reaction force to the load and the base wall responsive to a relative displacement of the load with respect to the base wall;

a damper controller operatively connected to the semi-active damper for controlling the reaction force applied to the load and the base wall;

a rechargeable power supply operably connected to the damper controller and the semi-active damper; and

a recharging arrangement in electrical communication with the rechargeable power supply, the recharging arrangement being mountable to one of the base wall and the load and being adapted for converting vibratory motion to electrical energy for storage in the rechargeable power supply.

30. (Original) A semi-active damping system according to claim 29 wherein the semi-active damper comprises one of a magnetorheological fluid damper and an electrorheological fluid damper.

31. (Original) A semi-active damping system according to claim 29 wherein the recharging arrangement includes an electrical coil, at least one spring and a magnet

connected to the at least one spring, the magnet being disposed within the electrical coil so that oscillation of the magnet produces a current in the electrical coil.

32. (Original) A semi-active damping system according to claim 29 wherein the recharging arrangement includes a piezoelectric generator.

33. (Original) A semi-active damping system according to claim 32 wherein the piezoelectric generator comprises at least one piezoelectric stack generator formed as a laminate of a plurality of prismatic piezoelectric crystals.

34. (Original) A semi-active damping system according to claim 29 wherein the rechargeable power supply includes one of a battery and at least one capacitor and is connected to the recharging arrangement through a rectifier bridge circuit.

35. (Original) A semi-active damping system according to claim 29 wherein the rechargeable power supply includes a plurality of ultracapacitors connected to the recharging arrangement through a rectifier bridge circuit.

36-41 (Canceled)